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| **From:** | Lindow, Emily |
| **To:** | Michael Weiss - NOAA Federal; William Douros - NOAA Federal |
| **Cc:** | Bowman, Randal; Walter Cruickshank; James Schindler |
| **Subject:** | BOEM Submission - EO 13795 |
| **Date:** | Friday, August 25, 2017 10:28:01 AM |
| **Attachments:** | BOEM EO 13795 Data Call FINAL with Attachment 8_25_17.pdf |

Attached are BOEM's responses to the technical questions posed by NOAA on June 20, 2017, related to analysis of energy and mineral impacts of sanctuary expansions and marine monument designations.

Thank you,
Emily

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**BOEM Response to NOAA EO 13795 Data Request**
**Review of National Marine Sanctuaries and Marine National Monuments**
**Energy and Marine Mineral Impacts**
**August 25, 2017**

Under Section 4.b.i.C of Executive Order 13795, NOAA is currently completing an opportunity cost analysis of the possible impacts that any National Marine Sanctuary (NMS) expansion, or Marine National Monument (MNM) designation/expansion, over the past 10 years could have on Outer Continental Shelf (OCS) oil and gas development, along with other offshore energy and mineral production. On June 20, 2017, NOAA made a request to BOEM for technical information to support their review.

BOEM responses to the NOAA questions are contained in this document. The responses are limited to areas within BOEM OCS jurisdiction. They are divided into three categories: (1) conventional energy, (2) renewable energy, and (3) marine minerals.

It should be noted that the following NMSs and MNMs are not within BOEM OCS jurisdiction, and thus they are not analyzed in our response:

1. Marianas Trench Marine National Monument
2. National Marine Sanctuary of American Samoa
3. Pacific Remote Islands Marine National Monument
4. Papahānaumokuākea Marine National Monument
5. Rose Atoll Marine National Monument
6. Thunder Bay National Marine Sanctuary

In addition to the analysis described above, BOEM is also including a copy of the analysis it provided NOAA in November 2016, related to offshore energy impact of two alternatives contained in the Draft Environmental Impact Statement for the Flower Garden Banks National Marine Sanctuary proposed boundary expansion.

## I. Offshore Conventional Energy

### 1. Northeast Canyons and Seamounts Marine National Monument

The Northeast Canyons and Seamounts Marine National Monument areas in the BOEM Northern Atlantic OCS Planning Area consist of two distinct units, with a combined surface area of approximately 3.11 million acres.

*NOAA Data Request 1: What are the estimated recoverable oil and gas reserves (including methane hydrates) for the area designated as Northeast Canyons and Seamounts Marine National Monument?*

BOEM Response: (b) (5) DPP [redacted]

*NOAA Data Request 2: What is the agency's confidence that these potentially recoverable reserves exist in each area.*

BOEM Response: (b) (5) DPP [redacted]

*NOAA Data Request 3: What is the estimated net value (in 2017 dollars) of those recoverable reserves? Please briefly lay out the method used to calculate estimated net value. Please account for the estimated cost to explore for, develop, process, and transport to refinery/market the estimated recoverable reserves.*

BOEM Response: (b) (5) DPP [redacted]

## 2. Channel Islands National Marine Sanctuary Expansion

The Channel Islands National Marine Sanctuary (CINMS) expansion extended the boundaries of the network of marine protective areas into deeper waters, adding about 9,600 acres according to the table provided by NOAA. This small area is non-contiguous across five distinct locations.

(b) (5) DPP [redacted]

### 3. Monterey Bay National Marine Sanctuary Expansion - (Davidson Seamount)

The Monterey Bay National Marine Sanctuary Expansion area straddles the BOEM Central and Southern California Planning Areas, and lies outside (seaward) of the basins currently assessed in BOEM's 2016 Assessment of Undiscovered Oil and Gas Resources on the OCS. Therefore, BOEM does not have estimates for undiscovered resources associated with this area. The nearest basin to this expansion area that is assessed by BOEM is the Santa Maria-Partington Basin, (b) (5) DPP [redacted].

### 4. Cordell Bank National Marine Sanctuary and Greater Farallones National Marine Sanctuary

*NOAA Data Request 1: What are the estimated recoverable oil and gas reserves (including methane hydrates) for the area designated as Cordell Bank National Marine Sanctuary and Greater Farallones National Marine Sanctuary?*

BOEM Response: The expansion of the Cordell Bank and Gulf of the Farallones National Marine Sanctuaries eliminated the entire Bodega Basin in the BOEM Central California Planning Area from any future consideration for oil and gas development. In addition, they removed about 10 percent of the Point Arena Basin in the BOEM Northern California Planning Area from such development.

Bodega Basin was already about 2/3 covered by the existing Gulf of Farallones and Cordell Bank NMSs. (b) (5) DPP [redacted]

*NOAA Data Request 2: What is the agency's confidence that these potentially recoverable reserves exist in each area.*

BOEM Response: (b) (5) DPP [redacted].

(b) (5) DPP [redacted]

*NOAA Data Request 3: What is the estimated net value (in 2017 dollars) of those recoverable reserves? Please briefly lay out the method used to calculate estimated net value. Please account for the estimated cost to explore for, develop, process, and transport to refinery/market the estimated recoverable reserves.*

BOEM Response: (b) (5) DPP [redacted]

**Additional Summary of Economic Impacts on OCS Oil and Gas Activities – Fiscal Year 2016**

BOEM has not conducted an economic impact analysis specific to the National Marine Sanctuaries and Marine National Monuments expansion areas listed above. However, in the context of the OCS as a whole, in FY 2016, BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) oversaw the production of approximately 592 million bbl of oil and 1.05 trillion cubic feet of natural gas on the OCS. This accounts for approximately 18 percent of domestic crude oil and 4 percent of domestic natural gas production. BOEM's economic impact models and the macroeconomic allocation factors estimate that the activities associated with OCS production resulted in more than $55 billion in the total U.S. fiscal year 2016 output. The rows in Table 1 below identify the contribution to employment and value added and the individual components contributing to these totals.

**Table 1. BOEM and BSEE Administered Industry Economic Impacts: FY 2016**

| | OCS Oil, Gas, and NGL Sales Value ($ millions) | Resulting Direct Domestic Spending ($ millions) | Resulting Total Domestic Output ($ millions) | Resulting Total Domestic Value Added ($ millions) | Domestic Jobs Sustained ('000s) |
|---|---|---|---|---|---|
| Industry Spending | $13,051 | $13,051 | $35,334 | $18,286 | 194 |
| Government Revenue (includes profit and dividend tax revenues) | $5,019 | $5,019 | $8,586 | $6,350 | 56 |
| After-Tax Profits (after profit and dividend taxes) | $8,032 | $4,638 | $11,536 | $6,247 | 66 |
| After-Tax Profits to Rest of World | $3,394 | NA | NA | NA | NA |
| After-Tax Profits Remaining in U.S. | $4,638 | $4,638 | $11,536 | $6,247 | 66 |
| Sales Value | $26,101 | $22,707 | $55,455 | $30,883 | 315 |

In summary, the total FY 2016 economic contributions from OCS oil and gas production and related activities resulted in $55 billion in total U.S. domestic output, $31 billion in total value added and 315 thousand domestic jobs sustained. This equates to approximately 500 domestic jobs sustained for every million barrels of oil produced on the OCS annually. (b) (5) DPP [redacted]

## II. Offshore Renewable Energy

### 1. Northeast Canyons and Seamounts Marine National Monument

The Northeast Canyons and Seamounts Marine National Monument encompasses a total of 4,913 square miles on the OCS. The canyons and seamounts are at least 3,900 meters below the sea surface, and approximately 130 miles offshore. While European wind farms utilizing floating wind turbines have been announced for water depths greater than 200 meters, at present technology does not exist that can accommodate the installation of a wind energy facility in extreme water depths. Statoil's *Hywind Scotland* pilot floating wind farm, which will be operational later this year, is in water depths of 95 – 120 meters. Additionally, the distance from shore to the monument makes energy development highly unlikely, considering the export cable to connect a project to the onshore electric grid could cost $1-2 million (or more) per mile to install.

(b) (5) DPP [redacted]

### 2. Channel Islands National Marine Sanctuary Expansion

The expansion extended the boundaries of the network of marine protective areas into deeper waters, adding about 9,600 acres according to the table provided by NOAA. The acreage is not contiguous, and (b) (5) DPP [redacted].

### 3. Monterey Bay National Marine Sanctuary Expansion (MBNMS) - (Davidson Seamount)

The Davidson Seamount Management Zone (DSMZ), bounded by geodetic lines connecting a rectangle centered on the top of the Davidson Seamount, consists of approximately 585 square nautical miles (nmi) (~496,000 acres) of ocean waters and the submerged lands thereunder. The Davidson Seamount occupies an area 23 nmi long and 7 nmi wide, one of the largest known seamounts in U.S. waters.

(b) (5) DPP [redacted]

[1] Smith, A., T. Stehly, W. Musial. 2015. 2014-2015 *Offshore Wind Technologies Market Report* (Technical Report). NREL/TP-5000-64283. National Renewable Energy Laboratory (NREL), Golden, CO (US). http://www.nrel.gov/docs/fy15osti/64283.pdf

(b) (5) DPP [redacted]

## 4. Cordell Bank National Marine Sanctuary and Greater Farrallones National Marine Sanctuary

The Cordell Bank and Greater Farralones National Marine Sanctuaries have high potential for leasing for offshore wind. The area encompassed by the expanded sanctuary boundaries has significant wind resource potential that could be economically developed for the San Francisco Bay Area using rapidly developing floating offshore wind turbine technology. The development of these wind resources for the load center of the Bay Area has been prohibited with the expansion of the boundaries of the sanctuaries.

The National Renewable Energy Laboratory (NREL) studied the resource potential offshore California for BOEM (https://www.boem.gov/2016-074/). NREL reviewed areas offshore California based on:

1. water depths of no deeper than 1000 meters;
2. wind speeds greater than 7 m/s;
3. access to electrical grid interconnection;
4. lowest use conflicts;
5. access to suitable ports; and
6. minimal visual impacts from nearshore siting.

One of the potential site areas (referred to as Site #4 in the NREL report) lies within both NMS expansions as shown on Figure 1.

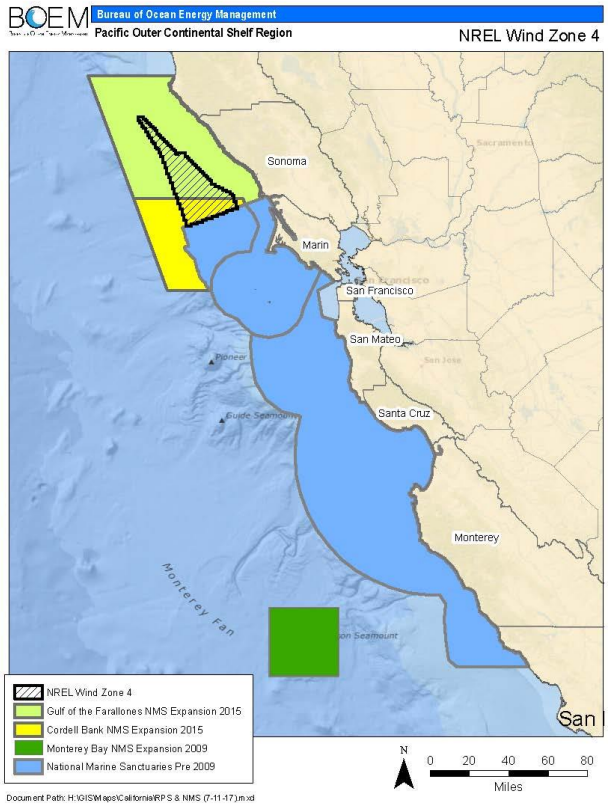


Figure 1

*NOAA Data Request 1*: *What is the estimated potential for offshore renewable energy production?*

BOEM Response: (b) (5) DPP [redacted]

(b) (5) DPP
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*NOAA Data Request 2*: *What is the agency's confidence that this renewable energy production potential exists in each area?*

BOEM Response: (b) (5) DPP
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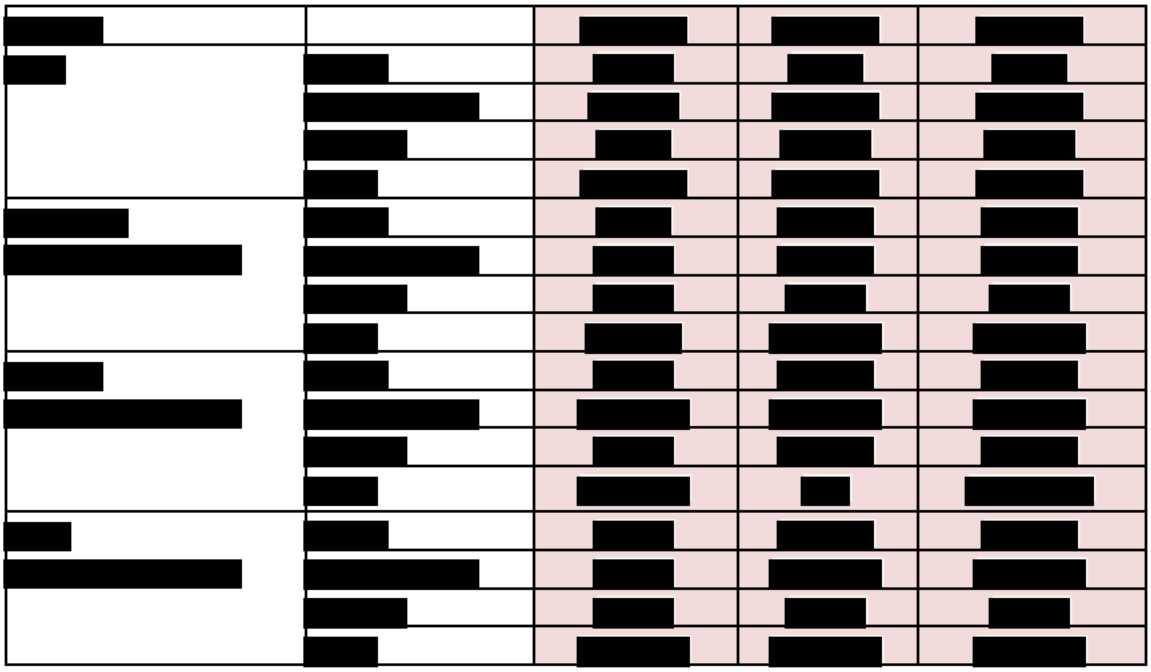
*NOAA Data Request 3:* *What is the estimated net value (in 2017 dollars) of this renewable energy potential? Please briefly lay out the method used to calculate estimated net value. Please account for the estimated cost to design, permit, develop, produce and transmit the electricity to market(s).*

BOEM Response: (b) (5) DPP

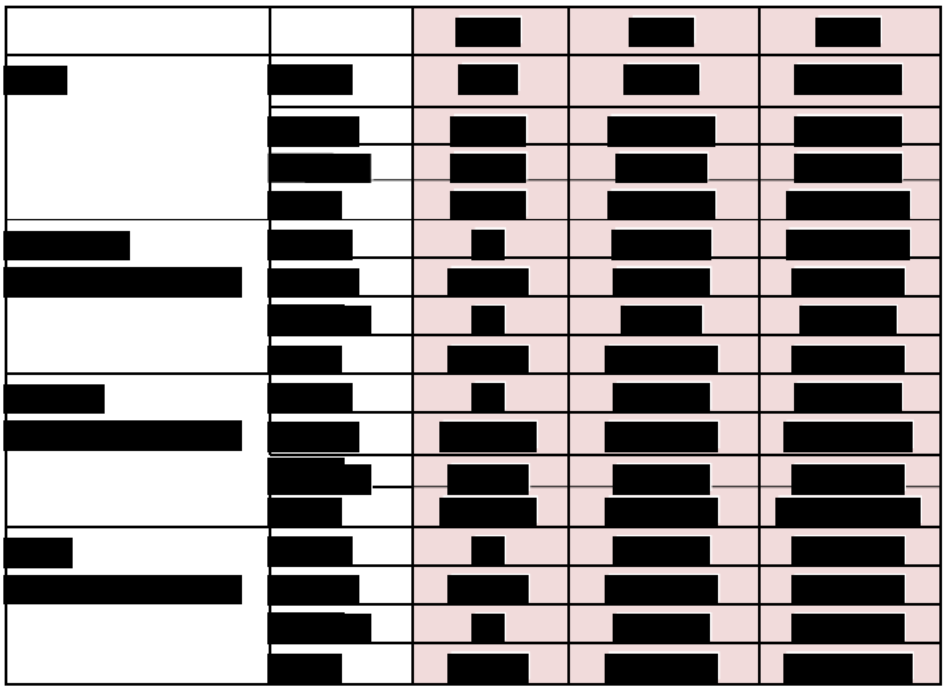
(b) (5) DPP

[redacted]

[redacted]



[redacted] (b)(5)DPP



[redacted]

[2] (b) (5) DPP [redacted]

## III. Marine Minerals

BOEM is the only federal agency authorized to convey marine minerals from the OCS. The bureau responds to commercial requests for OCS minerals, such as gold, manganese, or other hard minerals through competitive leasing procedures. Currently, interest and requests for non-energy marine minerals are comprised of shallow-water sand and gravel deposits proximal to the Atlantic, Gulf of Mexico, and Pacific coastlines for beach nourishment and coastal restoration projects.

Deep-ocean mineral extraction is an emerging technology coupled with a high risk of changing commodity prices. Shallow-water Alaskan gold and Atlantic heavy mineral sand deposits have generated some commercial interest in past years. In addition, there was an unsolicited request for a lease for seafloor massive sulfides in 2007 (withdrawn in 2008) within the Gorda Ridge area, located approximately 120 miles offshore the northern coast of CA and southern OR. However, BOEM has yet to issue a competitive lease in any region.

*NOAA Data Request 1*: *What is the estimated potential for development of offshore mineral resources within each of the national marine sanctuary and marine national monument designation and expansion areas in the Pacific OCS (see attached table and maps) and the area designated as Northeast Canyons and Seamounts Marine National Monument.*

*BOEM Response:* BOEM has not received a request or expression of interest for accessing base, precious, or critical metals in the four regions.

*NOAA Data Request 2:* *What is the agency's confidence that these offshore minerals exist and can be developed in each area?*

BOEM Response: There are no available site-specific survey data of hard mineral presence and abundance in these areas. However, scientific research has indicated that deposits of base, precious, and critical metal deposits exist in the deep ocean areas of seamounts, ridges (associated with canyons) and plateaus that may include the NMS and MNM regions. By the geologic nature of these features and their interaction in the deep ocean environment, they can be of greater concentration than terrestrial deposits. Mineral presence of seafloor massive sulfides, hydrothermal manganese-oxide deposits, ferromanganese (Fe-Mn) crusts and nodules, and rare earth-rich sediment are found in these regions.

To achieve an acceptable level confidence regarding the level of marine minerals in these areas, BOEM in coordination with the USGS, would require a base, precious, and critical metal inventory of the areas, and also need to develop an associated feasibility study. (b) (5) DPP [redacted]

*NOAA Data Request 3*: *What is the estimated net value (in 2017 dollars) of these offshore mineral resources? Please briefly lay out the method used to calculate estimated net value.*

*Please account for the estimated cost to explore for, permit, mine and transmit the minerals to market(s).*

BOEM Response: Marine mineral values compete directly with terrestrial mineral prices. As the mineral resources in MNMs and NMSs have not been delineated and the extraction costs have yet to be estimated, BOEM cannot estimate the potential net value of these offshore minerals at this time.

*NOAA Data Request 4: Assuming the national marine sanctuary/marine national monument had not been expanded/designated, are there any barriers (regulatory, physical, cost, other) to mining these offshore mineral resources: e.g., the cost/value of minerals; state or local regulatory barriers; technology needed to develop/mine in deep waters; or lack of industry interest?*

BOEM Response: Private industry has not expressed an interest in developing minerals in these areas to date, but may develop an interest in the future. While developing technology would make access possible, these projects would be very expensive. Changing mineral commodities prices also add financial risk to projects.

It should be noted that new advances in remotely operated equipment and high resolution geophysical capacities are eliminating prior technological limitations to delineate and access deep-ocean mineral deposits. As these technologies advance, it is possible that BOEM would receive commercial interest in accessing deep-ocean minerals within the next few years.